Nuclear Data for Multiple Prompt Gamma-ray Analysis

Yosuke Toh[1], Masumi Oshima[1], Mitsuru Ebihara[2]

[1] *Japan Atomic Energy Research Institute*
[2] *Tokyo Metropolitan University*

Most of nuclei emit two or more prompt gamma rays simultaneously in the neutron capture reaction. In MPGA, the prompt gamma rays are simultaneously measured by two or more sets of gamma ray detectors, these gamma rays are reconstructed in the pair of two prompt gamma rays, and it is added to the two dimensional spectrum which sets two axes as the energy for every events. The gamma-ray distribution corresponding to the pair of the gamma ray which are emitted simultaneously will be obtained. By analyzing this two-dimensional gamma-ray peak, resolution can be raised by leaps and bounds. MPGA needs not only the knowledge of energies of capture gamma-rays, but also nuclear structure data. While the energies are usually accurate, many of the excited level structures are of poor knowledge. Complete sets of these nuclear data are of great importance. New MPGA system will be constructed at the guide-hall of JRR-3M in Japan Atomic Energy Research Institute. This system consists of three Clover Ge detectors with anti-compton suppressor. The absolute efficiency of the system is about 10% for 1.3 MeV gamma-ray. It will be widely used in the fields of agriculture, engineering, geosciences, environmental science and so on.

Email: toh@jball4.tokai.jaeri.go.jp